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10/586,287	09/29/2006	Wei-Ping Chen	WPTHOM9.001APC	4155

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EXAMINER

LEE, RIP A

ART UNIT	PAPER NUMBER
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1796

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/586,287	Applicant(s) CHEN ET AL.	
	Examiner RIP A. LEE	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23-43 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 23-43 is/are rejected.
- 7) ☒ Claim(s) 23, 34, 35, 38, 39, 41 and 43 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07-13-2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claim 23 is objected to because of the following informalities: The entire recitation from “unsubstituted branched chain alkyl” to “unsubstituted hetroarylamino” which describes substituents R¹ and R² have been recited twice. From the specification, it would appear that Applicant intended to recite pairs of “unsubstituted” and “substituted” substituent. Appropriate correction is required.
2. Claim 23 is objected to because of the following informalities: In the section defining substituent R¹⁹, it appears that the phrase “or each substituent R¹⁸” should be rewritten as “or each substituent R¹⁹.” See fifth line from end of claim. Appropriate correction is required.
3. Claim 34 is objected to because of the following informalities: Please remove “of Claim 1” from the last line of the claim and insert in the first line after “ligand.” Appropriate correction is required.
4. Claim 34 is objected to because of the following informalities: In line 5, please replace “litiating” with “lithiating.” Appropriate correction is required.
5. Claim 35 is objected to because of the following informalities: In line 3, please replace “having” with “has.” Appropriate correction is required.
6. Claim 35 is objected to because of the following informalities: The claim is multiply dependent in that it is drawn to claim 34 and claim 1. Appropriate correction is required.
7. Claim 38 is objected to because of the following informalities: The claim is multiply dependent in that it is drawn to claim 37 and claim 1. Appropriate correction is required.

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8. Claim 39 is objected to because of the following informalities: The claim is multiply dependent in that it is drawn to claim 38 and claim 1 (two occurrences). Appropriate correction is required.

9. Claim 41 is objected to because of the following informalities: The recites the term "claim 1" three times. Appropriate correction is required.

10. Claim 43 is objected to because of the following informalities: The recites the term "claim 1" three times. Appropriate correction is required.

Claim Rejections - 35 USC § 112

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claim 26-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim states that inventive ligands have at least one additional element of chirality which may be planar chirality. Claimed substituted metallocenes, *ipso facto*, possess planar chirality, however, it is not clear from potential list of substituents and illustrated examples how a second element of planar chirality may be introduced into the molecule. Elucidation by way of an example is requested.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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14. Claim 23, 24, 26, and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Butler *et al.* (*Organometallics* **1986**, 5, 320-1328).

Compounds **19** (using Applicant's nomenclature, $R^1 = n\text{-Bu}$, $R^2 = \text{Ph}$, $Q = \text{CH}(R^8)\text{NR}^9R^{10''}$, where $R^8 = \text{H}$, $R^9 = R^{10''} = \text{Me}$), **20** ($R^1 = n\text{-Bu}$, $R^2 = \text{CMe}_3$), and **24** ($R^1 = \text{Ph}$, $R^2 = \text{CMe}_3$) meet the structural limitations set forth in instant claims. Compound **24** is isolated as the (R)-isomer.

15. Claims 23-26 and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Troitskaya *et al.* (*Russian Chemical Bulletin* **1999**, 48(9), 1738-1743).

Compounds (*Sp,Sp*)-**2** ($R^1 = \text{Ph}$, $R^2 = \text{Me}$, $Q = \text{CH}(R^8)\text{NR}^9R^{10''}$, where $R^8 = \text{H}$, $R^9 = R^{10''} = \text{Me}$) and diastereomer (*Sp,Rp*)-**3** ($R^1 = \text{Me}$, $R^2 = \text{Ph}$) meet the structural limitations set forth in instant claims.

16. Claims 23-26 and 29-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Gambs *et al.* (*Helvetica Chimica Acta* **2001**, 84, 3105-3126).

Diastereomeric pairs **2ia,b** ($R^{1/2} = \text{Ph}$, $R^{2/1} = 3,5\text{-C}_6\text{H}_3(\text{CF}_3)_2$, $Q = \text{CH}(R^8)\text{NR}^9R^{10''}$, where $R^8 = R^9 = R^{10''} = \text{Me}$) and **3ia,b** ($R^{1/2} = \text{Ph}$, $R^{2/1} = 3,5\text{-C}_6\text{H}_3(\text{CF}_3)_2$, $Q = \text{CH}(R^8)\text{WR}^6R^7$, where $R^8 = \text{Me}$, $W = \text{P}$, $R^6 = R^7 = \text{C}_6\text{H}_{11}$) meet the structural limitations set forth in instant claims. The ligand, $3,5\text{-C}_6\text{H}_3(\text{CF}_3)_2$, qualifies as "substituted carbocyclic aryl."

Examiner's note: While not recited in structural limitations of claim 23, as noted in paragraph 1, *supra*, it would appear that Applicant intended to recite pairs of "unsubstituted" and "substituted" substituent. In attempt to expedite prosecution, this rejection is set forth preemptively, and may be withdrawn should Applicant indeed intend to claim "unsubstituted carbocyclic aryl" only.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

19. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Butler *et al.* in view of Cullen *et al.* (*J. Am. Chem. Soc.* **1980**, *102*, 988-993).

Butler *et al.* teaches that inventive ferrocenes have utility as chiral ligands (page 1320, column 1), however, the inventors do not prepare metal complexes containing inventive ferrocenes. The inventors cite Cullen *et al.* (reference 6) as state of the art with respect to metal complexes containing such chiral metallocene ligands. Turning to the secondary reference, one skilled in the art finds that rhodium complexes of similar metallocene based ligands find utility as asymmetric hydrogenation catalysts. While rhodium is a group 9 metal, it belongs in the Group VIIIB triad of metals. The person of ordinary skill in the art would have found it obvious to use chiral ligands of Butler *et al.* to make corresponding rhodium catalysts, and since synthesis of related complexes is taught in the art, the skilled artisan would have expected to make rhodium complexes with a high degree of success.

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20. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Butler *et al.* in view of Knochel *et al.* (U.S. 6,284,925).

Butler *et al.* teaches that inventive ferrocenes have utility as chiral ligands (page 1320, column 1), however, the inventors do not disclose metal complexes containing inventive ferrocenes. At the time instant invention, use of chiral ferrocenes as ligands in metal complexes was intensively investigated in the art. Knochel *et al.* teaches that iron complexes of similar metallocene based ligands find utility as asymmetric hydrogenation catalysts. The person of ordinary skill in the art would have found it obvious to use chiral ligands of Butler *et al.* to make corresponding iron catalysts, and since synthesis of related complexes is taught in the art, the skilled artisan would have expected to make iron complexes with a high degree of success.

21. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Troitskaya *et al.*

Troitskaya *et al.* does not disclose preparation of metal complexes using inventive chiral ferrocenes as ligand, however, inventors contemplate their use: “heteroatomic ferrocene derivatives can be successfully used as ligands in catalytic processes (page 1738, paragraph 1).” Inventors also cite palladium complexes containing this class of ligand (page 1738, paragraph 3). The disclosure would have strongly suggested to the person of ordinary skill in the art that inventive chiral ferrocenes would be particularly well-suited for this end use. Thus, it would have been obvious to the person of ordinary skill in the art to make corresponding palladium complexes containing chiral ferrocenes of Troitskaya *et al.* as ligands. While palladium is a group 10 metal, it belongs in the Group VIIIB triad of metals.

22. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Troitskaya *et al.* in view of Knochel *et al.* (U.S. 6,284,925).

Troitskaya *et al.* contemplates use of inventive chiral ferrocenes as ligands for preparing catalysts, (page 1738, paragraph 1), however, the inventors do not disclose metal complexes containing inventive ferrocenes. At the time instant invention, use of chiral ferrocenes as ligands in metal complexes was intensively investigated in the art. Knochel *et al.* teaches that iron complexes of similar metallocene based ligands find utility as asymmetric hydrogenation catalysts. The person of ordinary skill in the art would have found it obvious to use chiral

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ligands of Troitskaya *et al.* to make corresponding iron catalysts, and since synthesis of related complexes is taught in the art, the skilled artisan would have expected to make iron complexes with a high degree of success.

23. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gambs *et al.*

Gambs *et al.* uses inventive chiral ferrocenes as ligands for preparing palladium complexes, however, due to difficulties with separation of diastereomers, the inventors did not pursue preparation of metal complexes with ligands **2ia,b** and **31a,b**. This point notwithstanding, one of ordinary skill in the art having read the reference would have found it obvious to prepare metal complexes with these ligands since the reference is directed to use of ligands to make metal complexes. It is maintained that inventor's attempts to separate ligand diastereomers would not have discouraged the person of skill in the art to carry out such an obvious "subsequent step." In fact, the person of skill in the art would have been motivated to isolate a diastereomeric metal complex in order to make a novel asymmetric catalyst with novel reactivity.

Double Patenting

24. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

25. Claims 23-43 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 14-38 of copending Application No. 10/586,204. Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims are drawn to substantially the same process of preparing metallocene based chiral ligand. Notably, copending claims recite substantially the same steps of ortho-lithiation in presence of a chiral/achiral or directing group (designated X*), and introducing substituent PR^1R^2 by subsequent reaction with R^1 -substituted phosphine followed by alkylation with R^2 -bearing Grignard reagent or organolithium. Chiral and achiral directing groups of copending claims 28 and 30 are identical to those recited in instant claims 36 and 42.

Claims of the copending application do not recite structures of the metallocene. Relevant section of the specification of copending application appears on page 22 of the disclosure, *inter alia*. One of skill in the art finds that the metallocene based chiral ligand prepared by the inventive process have the same structure as that recited in instant claims. Thus, the claims of the copending application are drawn to an obvious variant of the invention of the instant claims. Applicant's attention is drawn to MPEP § 804 where it is disclosed that "the specification can always be used as a dictionary to learn the meaning of a term in a patent claim." *In re Boylan*, 392 F.2d 1017, 157 USPQ 370 (CCPA 1986). Further, those portions of the specification which provide support for the patent claims may also be examined and considered when addressing the issue of whether a claim in an application defines an obvious variation of an invention claimed in the patent. *In re Vogel*, 422 F.2d 438, 164 USPQ 619,622 (CCPA 1970).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

/Rip A. Lee/
Examiner, Art Unit 1796

June 4, 2009